

TABLE OF CONTENTS

Table of Contents	i
List of Figures	iii
List of Tables.....	v

Section 1 Introduction

1.1 Structure Concept Report	1-1
1.2 Project Description.....	1-1
1.3 Project Site	1-2
1.4 Project Goals and Critical Issues.....	1-2

Section 2 Existing Conditions

2.1 Existing Bridge Configuration	2-1
2.2 Summary of Latest CDOT Inspection and Rating Report	2-1
2.2.1 Alignment and Profile	2-2
2.2.2 Bridge Cross Section.....	2-2
2.2.3 Horizontal Clearance.....	2-2
2.2.4 Overall Structural Condition	2-3
2.2.5 Substructure Condition.....	2-3
2.2.6 Superstructure Condition.....	2-4
2.2.7 Load Rating.....	2-4
2.3 Summary of Existing Conditions	2-5

Section 3 Recommended Scope of Bridge Improvements

3.1 Historical Considerations	3-1
3.2 Construction Alternates.....	3-1
3.3 Alignment Alternatives for New Construction	3-1
3.4 Rehabilitation of the Existing Bridge.....	3-4
3.4.1 Load Rating.....	3-4
3.4.1.1 Concrete Deck	3-4
3.4.1.2 Girders in Spans	3-5
3.4.2 Lead Paint Abatement	3-5
3.5 Cost Comparison of Alternates	3-7
3.6 Evaluation of Widening and New Build Alternates.....	3-7
3.6.1 Build a New Structure / Remove the Existing Structure....	3-8
3.6.2 Widen the Existing Structure	3-9
3.7 Conclusions and Recommended Alternate	3-13



Section 4 Structure Options

4.1 Layout Considerations.....	4-1
4.2 Layout Options	4-2
4.3 Span Layout and Structure Type Options	4-2
4.3.1 Match Existing Span Layout	4-2
4.3.2 Match Existing Span Layout over the Railroad Yard with Modified River Spans	4-3
4.3.3 Moderate Span Layout 1	4-4
4.3.4 Moderate Span Layout 2	4-4
4.3.5 Moderate Span Layout 3	4-5
4.3.6 Long Span Layout 1	4-5
4.3.7 Long Span Layout 2	4-6
4.3.8 Long Span Layout 3	4-6
4.4 Foundation Considerations.....	4-7
4.5 Summary	4-8

Section 5 Structure Evaluation

5.1 Evaluation Criteria	5-1
5.2 Description of Criteria.....	5-1
5.2.1 Impact to the Arkansas River Floodwall.....	5-1
5.2.2 Impact to the UPRR and BNSF Railroad Yards	5-2
5.2.3 Arkansas River Impacts	5-3
5.2.4 Bridge Aesthetics	5-3
5.2.5 Bridge Cost.....	5-4
5.2.6 Constructibility.....	5-6
5.2.7 Durability / Maintainability.....	5-6
5.3 Maintenance of Traffic.....	5-7
5.4 Summary Evaluation Matrix	5-7

Section 6 Summary and Recommendations

6.1 Project Description.....	6-1
6.2 Existing Conditions	6-1
6.3 Recommended Scope of Bridge Improvements.....	6-2
6.4 Structure Options.....	6-2
6.5 Structure Evaluation	6-3
6.6 Summary and Recommendations.....	6-3

LIST OF FIGURES

Figure 1.1	Existing Structure Site Location Map	1-3
Figure 2.1	Bent 1 Substructure Condition	2-7
Figure 2.2	Bent 1 Concrete Deterioration and Exposed Reinforcing ...	2-7
Figure 2.3	Bent 1 Concrete Beam Deterioration and Steel Corrosion.....	2-8
Figure 2.4	Bent 1 Concrete Deterioration and Steel Corrosion.....	2-8
Figure 2.5	Bent 2 Substructure Condition	2-9
Figure 2.6	Bent 2 Concrete Beam Deterioration	2-9
Figure 2.7	Bent 2 Concrete Beam Deterioration and Corroded Steel	2-10
Figure 2.8	Bents 1 and 2 Relative Condition.....	2-10
Figure 2.9	Bent 5 Substructure Condition	2-11
Figure 2.10	Bent 5 Concrete Column Deterioration and Corroded Rebar	2-11
Figure 2.11	Bent 5 Column Deterioration and Corroded Broken Rebar	2-12
Figure 2.12	Bent 5 Concrete Beam Deterioration and Corroded Rebar	2-12
Figure 2.13	Bent 5 Bent Cap Deterioration and Corroded Rebar.....	2-13
Figure 2.14	Bent 5 Bent Cap Deterioration and Corroded Rebar.....	2-13
Figure 2.15	Proximity of Pier 2 to BNSF Mainline Track (11'-0")	2-14
Figure 2.16	Proximity of Pier 3 to UPRR E. Mainline Track and Yard Track (10'-6")	2-14
Figure 2.17	Proximity of Pier 4 to UPRR Yard Tracks 13 and 14 (11'-9")	2-15
Figure 2.18	Proximity of Pier 5 to UPRR Yard Track and Floodwall (8'-3")	2-15
Figure 2.19	Storm Sewer Outfall and Erosion at West Abutment	2-16
Figure 2.20	Erosion at East Abutment.....	2-16
Figure 2.21	Flaking Lead Based Paint Span 1 Girders.....	2-17
Figure 2.22	Corrosion of Steel Members, Flaking Paint, Debris on Abutment Seat	2-17
Figure 2.23	Corroded Bridge Rail, Storm Sewer Outfall at West Abutment.....	2-18
Figure 2.24	Corrosion of Bridge Rail, Loop Ramp Under Span 1	2-18
Figure 2.25	Corroded Bridge Rail, Narrow Pedestrian/Bicycle Facilities	2-19
Figure 2.26	East Abutment Debris in Bearing Seat.....	2-19
Figure 2.27	Open Expansion Joint Device, Damaged Median Rail	2-20
Figure 2.28	Deck Joint at Pier 1 Causes Substructure Deterioration ...	2-20
Figure 3.1	North Alignment Concept	3-3
Figure 3.2	Elements with Low Load Rating.....	3-6
Figure 3.3	Widening Existing Bridge – Plan.....	3-11
Figure 3.4	Widening Existing Bridge – Section.....	3-12

Figure 4.1	Match Existing Span Layout – Plan.....	4-10
Figure 4.2	Match Existing Span Layout – Elevation.....	4-11
Figure 4.3	Match Existing RR Spans w/ Modified River Spans – Plan	4-12
Figure 4.4	Match Existing RR Spans w/ Modified River Spans - Elevation.....	4-13
Figure 4.5	Moderate Span Layout 1 – Plan	4-14
Figure 4.6	Moderate Span Layout 1 – Elevation.....	4-15
Figure 4.7	Moderate Span Layout 2 – Plan	4-16
Figure 4.8	Moderate Span Layout 2 – Elevation.....	4-17
Figure 4.9	Moderate Span Layout 3 – Plan	4-18
Figure 4.10	Moderate Span Layout 3 – Elevation.....	4-19
Figure 4.11	Long Span Layout 1 – Plan.....	4-20
Figure 4.12	Long Span Layout 1 – Elevation.....	4-21
Figure 4.13	Long Span Layout 2 – Plan	4-22
Figure 4.14	Long Span Layout 2 – Elevation.....	4-23
Figure 4.15	Long Span Layout 3 – Plan	4-24
Figure 4.16	Long Span Layout 3 – Elevation.....	4-25
Figure 4.17	Girder Erection with Ground Based Cranes.....	4-26
Figure 4.18	Cast-In-Place Balanced Cantilever Erection with Form Travelers (Long Span 3 Shown).....	4-26
Figure 6.1	Long Span Layout 3 – Plan	6-6
Figure 6.2	Long Span Layout 3 – Elevation.....	6-7
Figure 6.3	Moderate Span Layout 2 – Plan	6-8
Figure 6.4	Moderate Span Layout 2 – Elevation.....	6-9
Figure 6.5	Match Existing RR Spans w/ Modified River Spans – Plan	6-10
Figure 6.6	Match Existing RR Spans w/ Modified River Spans - Elevation.....	6-11

LIST OF TABLES

Table 2.1	Existing Horizontal Clearances in Railroad Yard	2-3
Table 2.2	Existing Structure Load Rating (tons).....	2-5
Table 3.1	Cost Comparisons of New Structure and Rehabilitate Existing Structure.....	3-7
Table 4.1	Summary of Possible Structure Types and Functional Characteristics	4-9
Table 5.1	Summary of Affected Tracks for Each Layout Option	5-3
Table 5.2	New Structure Comparison Costs	5-4
Table 5.3	Modified Comparison Costs	5-5
Table 5.4	Summary Evaluation Matrix	5-8
Table 6.1	Summary of Evaluation of Structure Options	6-5

